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(54) **Improvements in or relating to wrist supports.**

(57) A wrist support adapted to extend along and surround the forearm wrist and palm of the hand to restrict mobility of the wrist joint, the support being formed from a single piece of stretch fabric (10) consisting of a less easily stretchable transverse central band (21) and more easily stretchable transverse proximal and distal bands (25, 23). The support being formed in its outer surface with a longitudinal pocket (12) for a thin brace (14) and with attachment means (16, 20, 22) along its lateral edges for fastening said lateral edges together about the wrist. The attachment means (16, 20, 22) and the pocket (12) are positioned so that when in place a brace (14) of inflexible material in the pocket extends along the ventral surface of the forearm and wrist and underlies the palm so as to hold the hand in dorsoflexion. The band (21) of less stretchable material is positioned towards the proximal end of the support so as to act on the forearm and wrist but substantially not on the palm.

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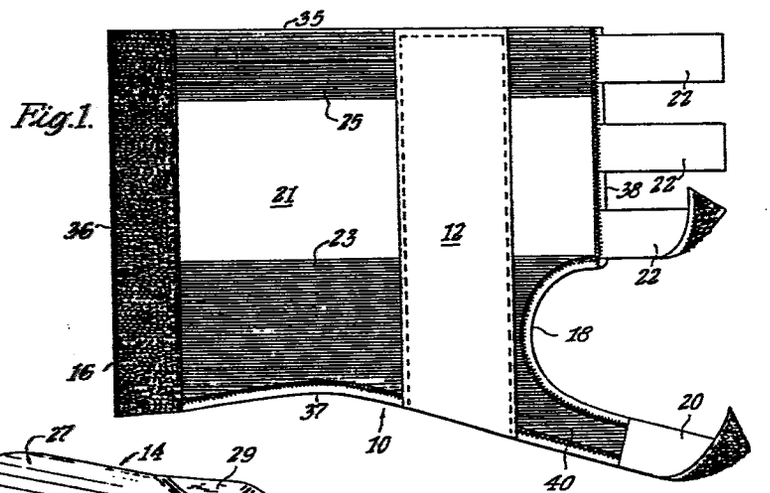

Fig.1.

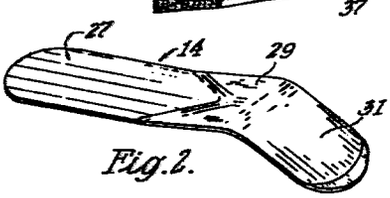

Fig.2.

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IMPROVEMENTS IN OR RELATING TO WRIST SUPPORTS

This invention relates to a wrist support.

A wrist support for use by sports people in which a metal sheet or strip in a pocket is held by semi-flexible fabric to the dorsal surface of the wrist is described in Patent Specification No. US-A-3533407. But the support does not hold the hand in dorsoflexion as is required in the treatment of more serious wrist injuries and rehabilitation.

Broadly stated the invention provides a wrist support adapted to extend along and surround the forearm wrist and palm of the hand to restrict mobility of the wrist joint, the support being formed from a single piece of stretch fabric consisting of a less easily stretchable transverse central band and more easily stretchable transverse proximal and distal bands, the support being formed in its outer surface with a longitudinal pocket for a thin brace and with attachment means along its lateral edges for fastening said lateral edges together about the wrist, characterised in that:

(a) the attachment means and the pocket are positioned so that when in place a brace of inflexible material in the pocket extends along the ventral surface

of the forearm and wrist and underlies the palm so as to restrict mobility of the wrist joint and hold the hand in dorsoflexion; and

(b) the band of less stretchable material is positioned towards the proximal end of the support so as to act on the forearm and wrist but substantially not on the palm.

The effect of the band positioning as aforesaid is to concentrate the support where it is needed without exerting unwanted pressure across the palm of the hand. When it is not being worn, the fabric of the support is undistorted which gives the support a more professionally-made and attractive appearance to the user without jeopardising the support provided. The use of a single piece of stretch fabric having purpose-designed asymmetrically located bands of different elastication is believed novel and leads to significant simplification of the manufacturing process, again without jeopardising the fit of the support or its function in supporting the wrist.

The invention further provides a method for making a wrist support which comprises:

providing a piece of fabric rendered resiliently stretchable by elastomeric yarn woven in one direction, said fabric consisting of a central band of less easily stretchable material bounded by bands of more easily stretchable material,. the central band being narrower than one of the outer bands and more than twice the width of the other, the direction of said bands defining a transverse direction of the eventual support;

cutting along the free edge of the wider of the more stretchable bands to conform the free edge to the palm of the hand and form the distal edge of the support;

cutting a concave thumb opening in one lateral edge of the fabric in the wider of the more stretchable bands; and

forming the attachment means along the lateral edges

of said fabric piece.

The support is advantageously provided on its outer face with a ventral pocket for insertion of a shaped support of rigid material defining the degree of dorsoflexion of the hand.

Conveniently Velcro tabs on one side edge of the support locate onto a Velcro pad on the other side edge to fasten the support about the wrist.

An embodiment of the invention will now be described by way of example only with reference to the accompanying drawings, in which:

Figure 1 is a view of the outer face of a wrist support laid out flat; and

Figure 2 is a view of a brace that fits into the support of Figure 1.

In the drawings, a fabric wrist support 10 is formed on its outer face with a pocket 12 into which may be inserted a metal brace 14 to restrict mobility of the wrist and the palm of the hand. The brace 14 comprises a region 27 which is concave in the transverse direction to underlie and conform to the curvature of the forearm and increase the rigidity of the brace, a planar region 29 that underlies the wrist and an upwardly cranked region 31 that underlies the palm of the hand and holds it in dorsoflexion. Along the outer face of one side edge of the support 10 is attached a Velcro fastening strip 16 of the loop type. The other side edge is concavely profiled at 18 to define a thumb aperture and has a tab 20 that is passed between the thumb and index finger and wrist and forearm tabs 22. The tabs 20, 22 are of hook Velcro material complementary to that of the support 10. The pocket 12 is located so that when the brace 14 is in place and is positioned properly along the palm and forearm the thumb engages in the wrist aperture 18. The Velcro band 16 is located so as to be aligned with the forefinger and to extend along the dorsal surface of the forearm. The edges 36, 38 abut when the support is being worn and the

edge 38 is spaced sufficiently widely from the pocket 12 that the brace 14 lies in correct alignment along the ventral surface of the forearm. The peninsula 40 of fabric leading to the tab 20 is made long enough to extend around the forefinger to the band 16. If there is insufficient fabric between edge 38 and pocket 12 and if the peninsula 40 is too short, the thumb aperture provides only a restricted movement of the thumb and the brace 14 is pulled transversely out of alignment with the forearm.

It will be noted that the body of the wrist support is formed from a single piece of fabric having a central wrist region or band 21 of less stretchable material and distal and proximal regions or bands 23, 25 of more stretchable material positioned to correspond to the palm and forearm of the wearer. A suitable fabric for making a wrist support according to the invention has the following characteristics:

Width	187mm Overall
Materials	Cotton 83.046%
	Rubber 16.954%
	Body 108 Ends x 16/2 Cotton
	Centre 116 Ends x 40/2 Cotton
	Cotton covered rubber 115 Ends x CR.241 (M. Wright & Sons)
	Weft 1 End x 16/2 Cotton
	Picks at Loom 25.6 per 1"
	Picks Rest 63 per 1"
Stretch	Unfinished 120%
	Finished 130%

Spacing of Fabric/Overall Width 187 mm

29mm	15 Rubbers 26 Ends 16/2 Cotton 12 Rubbers per 1"	Proximal Band 25
68mm	57 Rubbers 116 Ends 40/2 Cotton 22 Rubber per 1"	Central Band 21

90mm	43 Rubbers	Material to form distal
	83 Ends 16/2 Cotton	band 23
	12 Rubbers per 1"	

The wrist region or band 21 is asymmetrically located to provide maximum support to the wrist joint, with the width of the central band 21 being more than twice that of the proximal band 25 of more stretchable material but less than the greatest width of the distal band 23 of more strechable material. The thumb aperture 18 is formed only in the wider region 23 of more easily stretchable material. The fabric is made resiliently stretchable by the presence of transverse ends of elastomeric material and the central band 21 contains more elastomeric ends per unit length than the proximal or distal bands 25, 23.

The wrist support of the invention is durable and effective. It will be noted that the support of the invention is easy to make because only one piece of stretch fabric is used and that fabric has bands of different elastication of the required widths and characteristics. The proximal edge 35 need not be cut and only a straight cut is needed at the lateral edge 36 that carries the Velcro strip 16. Only the distal edge 37 of the wider more flexible band 23 need be cut to conform, when folded over, to the shape of the palm, and a concave generally semi-circular cut-out 18 is formed in the other lateral edge 38 which also has attached thereto the Velcro tabs 20, 22. Only the minimum of cutting and edge binding operations are required.

CLAIMS:

1. A wrist support adapted to extend along and surround the forearm wrist and palm of the hand to restrict mobility of the wrist joint, the support being formed from a single piece of stretch fabric (10) consisting of a less easily stretchable transverse central band (21) and more easily stretchable transverse proximal and distal bands (25, 23), the support being formed in its outer surface with a longitudinal pocket (12) for a thin brace (14) and with attachment means (16, 20, 22) along its lateral edges for fastening said lateral edges together about the wrist, characterised in that:

(a) the attachment means (16, 20, 22) and the pocket (12) are positioned so that when in place a brace (14) of inflexible material in the pocket extends along the ventral surface of the forearm and wrist and underlies the palm so as to hold the hand in dorsoflexion; and

(b) the band (21) of less stretchable material is positioned towards the proximal end of the support so as to act on the forearm and wrist but substantially not on the palm.

2. A wrist support according to Claim 1, wherein a generally semi-circular cut-out (18) defining a thumb aperture is made only in a distal band (23) of more stretchable material that is wider than the proximal band (25) of more stretchable material.

3. A wrist support according to Claim 1 or 2, wherein the fabric is made resiliently stretchable by the presence of transverse ends of elastomeric material and the central band (21) contains more elastomeric ends per unit length than the proximal or distal bands (25, 23).

4. A wrist support according to Claim 3, wherein the width of the central band (21) is more than twice that of the proximal band (25) of more stretchable material but less than the greatest width of the distal band (23) of more strechable material.

5. A wrist support according to any preceding claim,

wherein the brace (14) comprises a concave proximal region (27) to underlie the forearm, a flat region (29) to underlie the wrist and an upwardly cranked region (31) to underlie the palm.

6. A support according to any preceding claim, wherein the fastening means comprises tabs (20, 22) of hook-type fibrous fastening fabric along one lateral edge and a strip (16) of eye-type fibrous fastening fabric along the other edge.

7. A method of making a wrist support which comprises:

providing a piece of fabric rendered resiliently stretchable by elastomeric yarn woven in one direction, said fabric consisting of a central band (21) of less easily stretchable material bounded by bands (25, 23) of more easily stretchable material, the central band (21) being narrower than one of the outer bands (23) and more than twice the width of the other (25), the direction of said bands (21, 23, 25) defining a transverse direction of the eventual support;

cutting along the free edge (37) of the wider of the more stretchable bands (23) to conform the free edge (37) to the palm of the hand and form the distal edge of the support;

cutting a concave thumb opening (18) in one lateral edge (38) of the fabric in the wider of the more stretchable bands (23); and

forming the attachment means (16, 20, 22) along the lateral edges of said fabric piece.

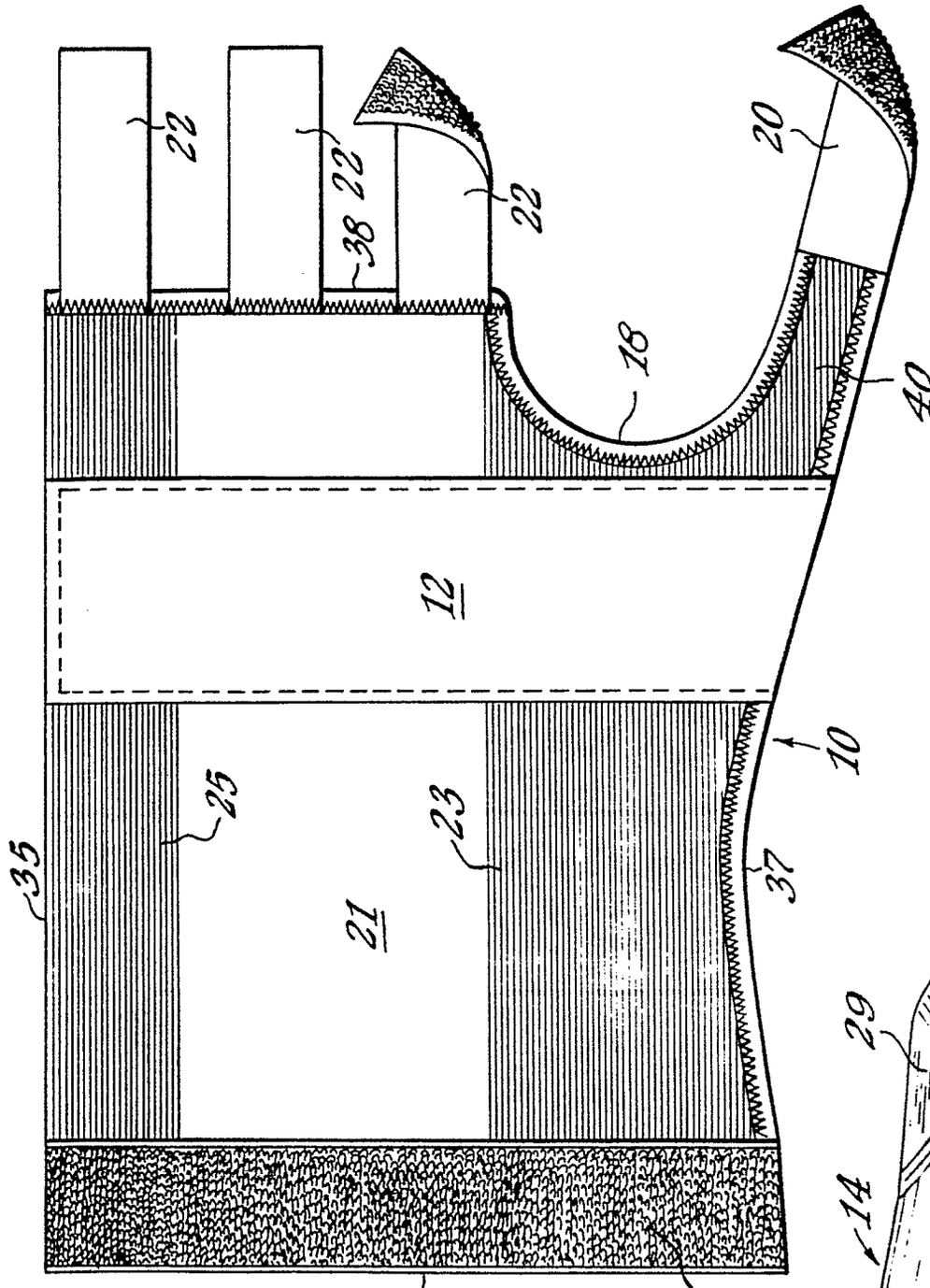

Fig.1.

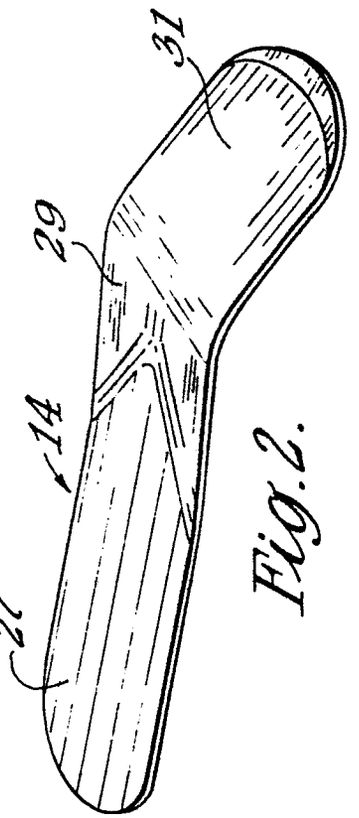

Fig.2.

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EUROPEAN SEARCH REPORT

0162610

Application number

EP 85 30 2945

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
A,D	US-A-3 533 407 (SMITH) * Figures; column 1, line 44 - column 3, line 22 *	1	A 61 F 13/10 A 61 F 5/01
A	DE-A-3 028 381 (KARLHEINZ) * Figures; claim 1 *	1	
A	US-A-3 327 703 (GAMM)		
A	GB-A-1 093 338 (STUBBS)		
A	DE-C- 587 234 (RUMMEL)		
A	US-A-4 315 504 (DRENNAN)		TECHNICAL FIELDS SEARCHED (Int. Cl.4) A 61 F
A	FR-A-1 124 593 (LA GAINE SCANDALE)		

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	22-07-1985	STEENBAKKER J.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

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